

# **EXHIBIT C**

**To the**

**DECLARATION OF MICHAEL A. SCHWARTZ IN SUPPORT OF THE  
SATURN PLAINTIFFS' MEMORANDUM OF LAW IN OPPOSITON TO  
DEBTORS' OBJECTION TO PROOFS OF CLAIM NOS. 16440 and 16441**

HEARING DATE AND TIME: February 3, 2011 at 9:45 a.m. (Eastern Time)  
RESPONSE DEADLINE: January 27, 2011 at 4:00 pm (Eastern Time)

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Co-Lead Counsel for the Plaintiff Class in  
*In re Saturn L-Series Timing Chain Products Liability Litigation*,  
MDL No. 1920 (D. Neb.), AO9-8038-TJM (Bankr. D. Neb.)

**UNITED STATES BANKRUPTCY COURT  
SOUTHERN DISTRICT OF NEW YORK**

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In re	:
	:
MOTORS LIQUIDATION COMPANY, <i>et al.</i> ,	:
F/K/A General Motors Corp., <i>et al.</i> ,	:
	:
Debtors.	:
-----X	
	Chapter 11 Case No.:
	09-50026 (REG)
	(Jointly Administered)

**DECLARATION OF THOMAS L. READ, Ph.D., IN SUPPORT OF THE  
SATURN L-SERIES TIMING CHAIN PRODUCTS LIABILITY LITIGATION  
CLASS CLAIM NOS. 16440 AND 16441 AND IN OPPOSITON TO  
DEBTORS' OBJECTION THERETO**

Thomas L. Read, Ph.D., being duly sworn, deposes and says:

1. I am over the age of 18 and have personal knowledge of the facts set forth herein, which are known to me to be true and correct. I could and would testify competently about the matters set forth herein if called upon to do so.
2. I submit this Declaration in support of the claim submitted on behalf of the Class in *In re Saturn L-Series Timing Chain Products Liability Litigation*, MDL No. 1920 (D. Neb.) (“Saturn Timing Chain Class”), Claim Nos. 16440 and 16441, and in opposition to Debtors’ (General Motors Corporation “GM” *et al.*) objection thereto.

**Expert Qualifications**

3. See attached CV (Exhibit A).

**Prior Expert Testimony At Trial or by Deposition  
Within the Preceding Four Years, and Compensation**

4. During the preceding four years, I have testified as an expert in a deposition or at trial in the matters listed in the attached Exhibit B.
5. My billing rate in this matter is \$ 275.00 per hour.

**Scope of Engagement**

6. I have been retained by Plaintiffs’ co-lead counsel in *In re Saturn L-Series Timing Chain Products Liability Litigation*, MDL No. 1920 (D. Neb.), to provide my expert opinions concerning the following issues involving GM production part number 90537338 steel timing chain (the “Timing Chains”) and GM production part number 90537476 timing chain oiling nozzle (the “Oiling Nozzles”) found in the following vehicles manufactured by GM and Saturn Corporation: (i) model year 2000 - 2003 Saturn L-Series; (ii) model year 2002 - 2003 Saturn Vue; or (iii) model year 2003 Saturn Ion,

each equipped with a 2.2 Liter, 4-cylinder, 137-horsepower dual-overhead-cam, Ecotec L61 Engine (the “2.2L Ecotec L61 Engine”) (the “Saturn Class Vehicles”):

- (i) whether the Oiling Nozzles were improperly designed and thereby caused the Timing Chains to rapidly wear, bend, stretch and/or become brittle, and to slip off the teeth of the main drive sprocket and camshaft sprockets, or to break completely;
- (ii) whether the Oiling Nozzles were improperly designed so as to specifically prevent oil from flowing to the Timing Chains at low and idle speeds, and, as a result, the lack of oil caused excessive friction and heat in the Timing Chains, which caused the metal on the Timing Chains to rapidly wear, bend, stretch and/or become brittle, thereby causing the Timing Chains to break;
- (iii) whether as a result of the improper design of the Oiling Nozzles, up to fifteen times less oil flowed to the Timing Chains, which led to insufficient lubrication of the Timing Chains at low and idle speeds, causing excess friction and heat buildup, thereby causing the Timing Chains to rapidly wear, bend, stretch and/or become brittle and break; and
- (iv) whether excessive heat causes the metal on the Timing Chains to rapidly wear, bend, stretch and/or become brittle, thereby causing the Timing Chains to slip off the teeth of the sprockets, or to break completely.

**Bases For Opinions**

7. The basis for the opinions expressed below is derived from the following:

- (a) My education as a materials scientist and engineer;

(b) My 35 years of experience as a materials scientist, engineer, metallurgist and manufacturing design engineer;

(c) My inspections and testing of: (i) six Oiling Nozzles and Timing Chains; (ii) the replacement oiling nozzles and timing chains GM introduced in 2002 to remedy the defect described herein; (iii) the broken Timing Chains and Oiling Nozzles from the model year 2002 Saturn Vue owned by a Saturn Class member; and

(d) My review of: the owner manuals for the Saturn Class Vehicles; documents submitted by GM and Saturn to the National Highway Traffic Safety Administration (“NHTSA”); correspondence from NHTSA to GM and Saturn; complaints made by owners of Saturn Class Vehicles to NHTSA; and technical service bulletins issued by GM and Saturn, including Technical Service Bulletin 97-T-15A.

**Statement of Opinions**

8. Based on my examinations and testing described above, as well as my experience as a metallurgist and manufacturing design engineer, it is my professional opinion that the Oiling Nozzles contain an inherent defect which I describe below, and which I believe is substantially certain to manifest itself during normal operation of the Class Vehicles during their useful life.

9. It is my professional opinion that the Oiling Nozzles are defective because, during normal use, the Oiling Nozzles did not adequately lubricate the Timing Chains, subjecting the Timing Chains to excessive heat and friction, which caused the metal on the Timing Chains to rapidly wear, bend, stretch and/or become brittle, thereby causing

the Timing Chains to slip off the teeth of the main drive sprocket and camshaft sprockets, or to break completely.

#### **Function of Timings Chains and Oiling Nozzles**

10. A timing chain is simply a series of traveling journal bearings with a means to engage the teeth of a sprocket and precisely transmit force and motion. Because each chain joint is a bearing, proper lubrication is essential to obtain the maximum service life from a chain drive.

11. The engine in the Class Vehicles, the 2.2L Ecotec L61 Engine, uses a hydraulic tensioner and a tension lever to keep the Timing Chain taut. Tension is critical. Any slippage due to lack of proper tension will result in: (a) the Timing Chain falling off the sprockets; (b) the Timing Chain rapidly wearing and breaking; and (c) potentially disastrous timing problems, including the opening of the exhaust valve during compression, or the closing of the exhaust valve during the exhaust stroke. It is important to note that the tensioner can only work within certain limits; thus, if the Timing Chain becomes too long, the tensioner cannot apply the proper operating tension to the Timing Chain, resulting in the Timing Chain falling off the sprockets and/or rapidly wearing and breaking.

12. The Oiling Nozzle is placed above the Timing Chain for the primary purpose of ensuring that the Timing Chain receives adequate lubrication. Engine oil is fed to the Oiling Nozzle by the oil pump.

13. The Timing Chain must stay well lubricated. Proper lubrication is essential to obtain the maximum service life from the Timing Chain. Lack of proper lubrication will cause increased friction and power consumption and cause a harmful temperature rise in

the steel of the Timing Chain. Excessive heat causes rapid wear of the metal on the Timing Chain. In addition, the Timing Chain metal will also bend, stretch and/or become brittle, causing the Timing Chain to deform (elongate) and slip-off the teeth of the sprockets, or to break completely.

#### **The Oiling Nozzles Were Improperly Designed**

14. The Oiling Nozzles were improperly designed with a “pintle valve” and “regulator spring design,” the result of which prevented the adequate flow of oil to the Timing Chains at low and idle speeds. See Photo A below, of a cross-cut of an Oiling Nozzle from a Saturn Class Vehicle exposing the pintle valve:

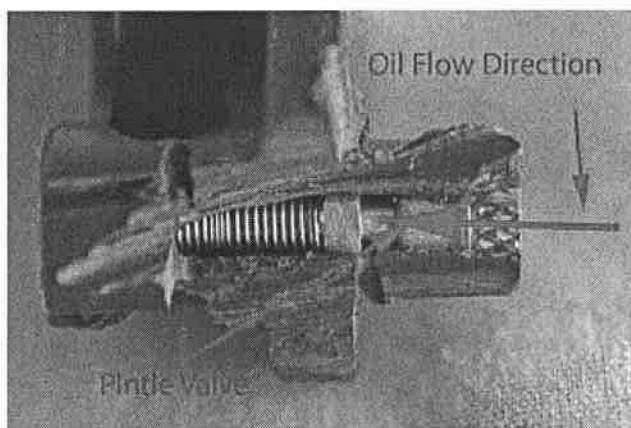


Photo A

15. A pintle valve is simply a plug with a spring behind it. When sufficient oil pressure is exerted on the spring, the plug is pushed forward, allowing oil to flow around the plug. It is important to realize that the pintle valve structure is inserted in the oil flow channel, and this also restricts oil flow.

16. By equipping the Oiling Nozzles with a pintle valve, the size of the orifice through which oil flowed into the pintle valve was decreased so as to restrict the flow of oil through the Oiling Nozzles.

17. Additionally, the Oiling Nozzles were designed with a brass washer at the opening of the Oiling Nozzles, which further restricted the flow of oil into the Oiling Nozzles.

18. As a result of the design defect in the Oiling Nozzles, the pintle valve restricted the flow of oil through the Oiling Nozzles to the Timing Chains for several reasons:

- (a) The entrance opening of the Oiling Nozzles was reduced by the brass washer;

- (b) The pintle valve did not fully open until an operating pressure of 20 psi (pound per square inch) was reached;

- (c) At low and idle speeds, the oil pump on the 2.2L Ecotec L61 Engine produced an approximate oil pressure of 14 psi, thereby not producing the 20 psi of pressure necessary to open the pintle valve and allow oil to flow through the Oiling Nozzles to the Timing Chains;

- (d) Even when the pintle valve was fully opened, the pintle valve obstructed the oil flow channel and restricted oil flow through the Oiling Nozzles;

- (e) The pintle structure includes a plug, a pin and a spring, present in the oil flow channel, which will eventually become loaded with debris carried by the oil and permanently constrict (or plug) the oil flow channel. This constriction interferes with and/or stops lubrication of the Timing Chain and causes its rapid deterioration;



(f) The very low flow rates during idle can allow debris carried by the oil to plug the oil entrance and exit holes.

19. As a result of the foregoing defective design of the Oiling Nozzles, an oil flow rate of up to fifteen (15) times *less* than what was necessary to keep the Timing Chains properly lubricated resulted.

20. My conclusions are confirmed by GM. In a letter dated April 12, 2006 letter to NHTSA's Office of Defects Investigation (the "April 12, 2006 Letter"), GM stated that the pintle valve design of the Oiling Nozzles, led to "*insufficient lubrication*" of the Timing Chains at low and idle speeds, which caused excess friction and heat buildup, thereby causing the Timing Chains to become brittle and break. GM's April 12, 2006 Letter to NHTSA is annexed hereto as Exhibit C, p. 14.

21. In order to remedy this design defect, GM stated that it redesigned the Oiling Nozzles to no longer contain a pintle valve, but to contain a "full time flow oil nozzle," thereby no longer preventing oil from flowing to the Timing Chains at low and idle speeds. See Exhibit C, p. 10. Moreover, this obstruction-free oiling nozzle is less likely to become plugged with debris carried by the oil. See Photo B below, comparing an Oiling Nozzle from a Saturn Class Vehicle (left) with GM's redesigned replacement oiling nozzle (right); and Photo C below, a cross-cut of a replacement oiling nozzle:

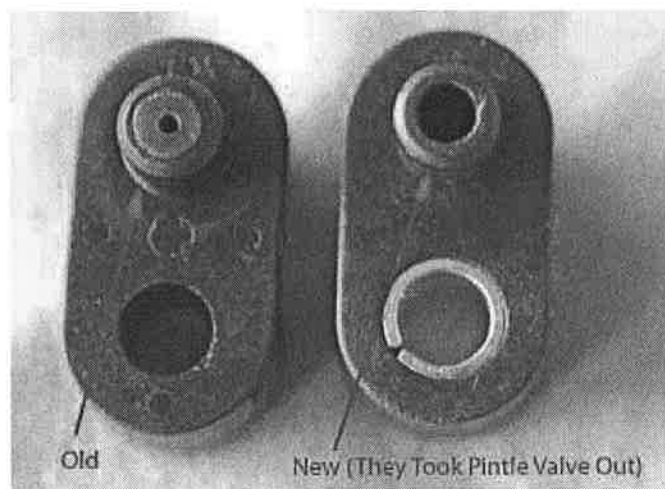


Photo B



Photo C

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct and that this Declaration was executed on this 17th day of January, 2011 at Santa Rosa, California.

/s/ Thomas L. Read  
Thomas L. Read, Ph.D